Hall Ticket Number:

Code No. : 14168 N

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. IV-Semester Main Examinations, July/August-2023

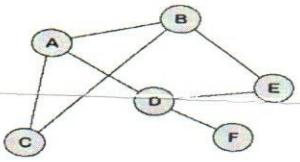
Principles of Data Structures

(Common to Civil & Mech. Engg.)

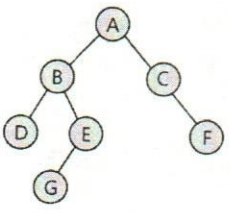
Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What is the node structure of circular linked list?	2	1	1	1
2.	What is Linear Data structure?	2	1	1	1,2
3.	What is stack underflow?	2	1	2	1
4.	In the queue, if front=x and rear =y (x<=y) then the number of elements in the queue.	2	1	2	1,2
5.	Write an inorder traversal algorithm to traverse the binary tree.	2	2	3	1
6.	Write any four properties of binary tree.	2	1	3	1,2
7.	What is adjacency list representation of the graph?	2	1	4	1
8.	 Represent above graph by using adjacency matrix.	2	2	4	1,2
9.	Define time complexity. What is the worst case time complexity of selection sort?	2	1	5	1
10.	When can we perform binary search on given elements? Briefly outline the procedure.	2	1	5	1

Part-B (5 × 8 = 40 Marks)

11. a)	What is data structure? Explain the types of data structures.	4	1	1	1
b)	Write an algorithm to insert an element in the given single linked list.	4	2	1	1
12. a)	What is stack? Write and explain algorithms to implement stack by using array.	4	2	2	1
b)	Evaluate the postfix expression 3 4 * 2 5 * +. Show the stack contents in the evaluation.	4	3	2	1,2
13. a)	 Represent above tree with an array.	4	3	3	1

Contd... 2

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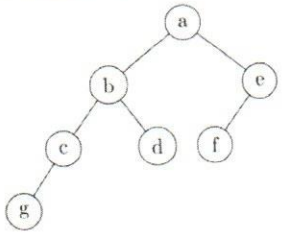
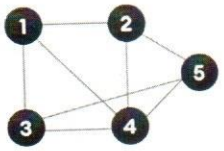
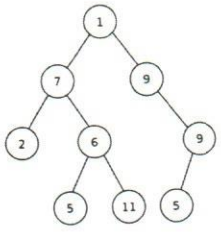
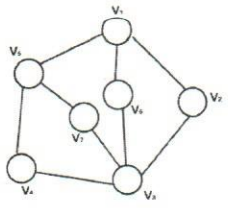
b)			4	3	3	1,2
	Traverse the above binary tree by preorder traversal technique.					
14. a)			4	3	4	1,2
	Apply DFS traversal Technique to above graph with starting vertex 1.					
b)	Compare and Contrast the BFS and DFS traversal techniques.		4	2	4	1,2
15. a)	Apply Binary search algorithm to the following input 10, 20 30,40,50,60 for the key elements i) 50 ii) 15.		4	3	5	1,2
b)	Apply insertion sort algorithm to following input: 10, 20, 5, 15, 25, 18, and 21. Show the output after each iteration.		4	3	5	1
16. a)	Outline about the doubly linked list with an example.		4	2	1	1
b)	Outline how a linked list can be used to implement a stack.		4	2	2	1
17.	Answer any ***two*** of the following:					
a)			4	3	3	1,2
	Traverse the above binary tree with post order traversal technique.					
b)			4	3	4	1,2
	Apply BFS algorithm to above graph with the starting vertexV_1.					
c)	Apply bubble sort algorithm to the following input: 10, 40, 70, 30, 50, 20, 80, and 60. Show the output after each iteration.		4	3	5	1,2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	36%
iii)	Blooms Taxonomy Level – 3 & 4	44%

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